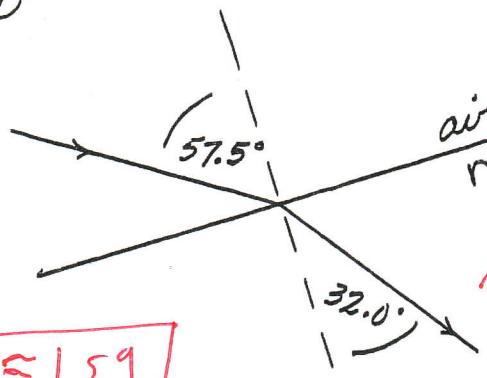
① 

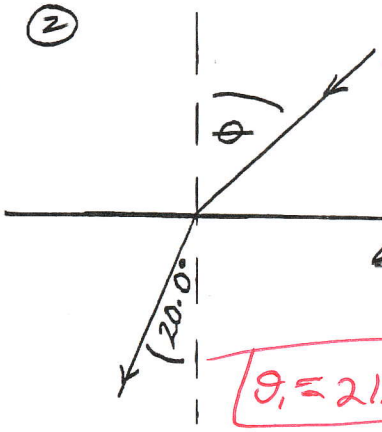
FIND n

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$n_2 = \frac{n_1 \sin\theta_1}{\sin\theta_2}$

$n_2 = \frac{1(\sin 57.5)}{\sin 32.}$

$n \simeq 1.59$

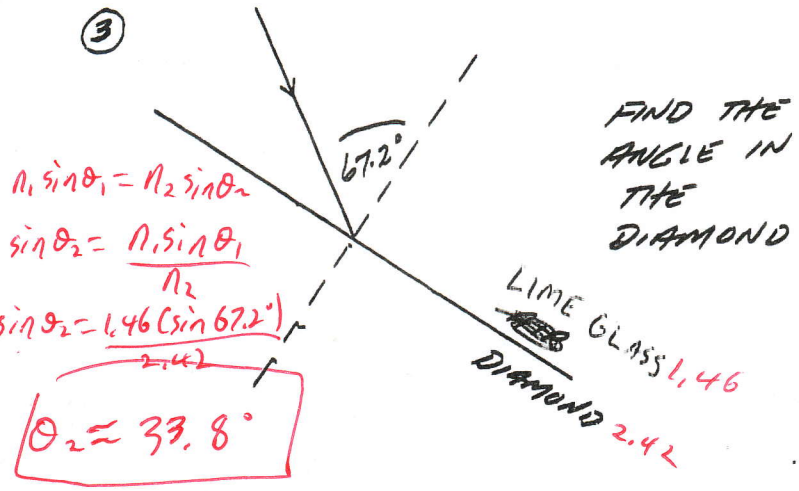
② 

$\sin\theta_1 = \frac{n_2 \sin\theta_2}{n_1}$

$\sin\theta_1 = \frac{1.54 \sin(20.0°)}{1.43}$

$\theta_1 \simeq 21.6°$

FIND θ

③ 

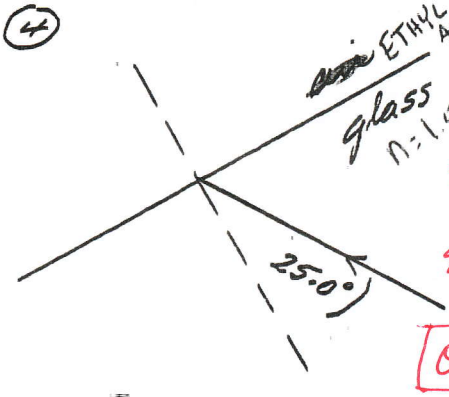
FIND THE ANGLE IN THE DIAMOND

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\sin\theta_2 = \frac{1.46(\sin 67.2°)}{2.42}$

$\theta_2 \simeq 33.8°$

④ 

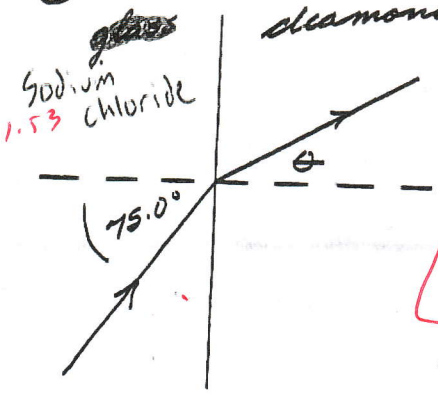
$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\sin\theta_2 = \frac{1.50(\sin 25}{1.37}$

$\theta_2 \simeq 27.6°$

FIND THE ANGLE IN THE ALCOHOL.

⑤ 

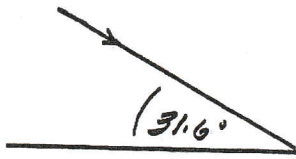
$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\sin\theta_2 = \frac{1.53(\sin(25))}{2.42}$

$\theta_2 \simeq 37.6°$

FIND θ

⑥ 

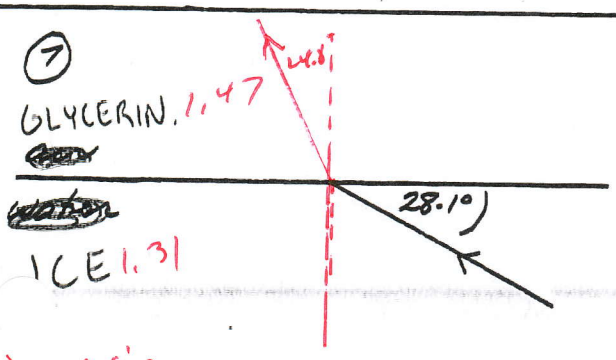
$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\sin\theta_2 = \frac{1.33 \sin(31.6°)}{1.52}$

$\theta_2 \simeq 27.3°$

FIND THE ANGLE IN GLASS

⑦ 

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\sin\theta_2 = \frac{1.31 \sin(28.1°)}{1.47}$

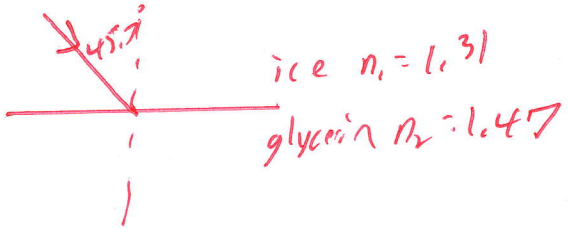
DRAW THE PATH OF THE LIGHT RAY.

$\theta_2 = 24.8°$

DO THE ABOVE PROBLEMS IN YOUR NOTEBOOK DO NOT WORK ON THIS SHEET

Snell's Law Worksheet 2 Back

1)



$n_1 = 1.31$

$\theta_1 = 45.7°$

$n_2 = 1.47$

$\theta_2 = ?$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \dfrac{n_1 \sin\theta_1}{n_2}$

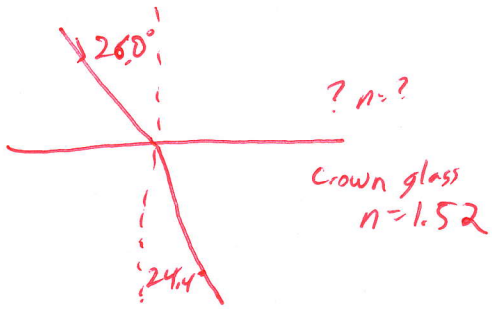
$\sin\theta_2 = \dfrac{1.31(\sin 45.7°)}{1.47}$

$\sin\theta_2 \approx 0.63779$

$\theta_2 \approx \sin^{-1}(0.63779)$

$\boxed{\theta_2 \approx 39.6°}$

2)



$n_1 = ?$

$\theta_1 = 26.0°$

$n_2 = 1.52$

$\theta_2 = 24.4°$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$n_1 = \dfrac{n_2 \sin\theta_2}{\sin\theta_1}$

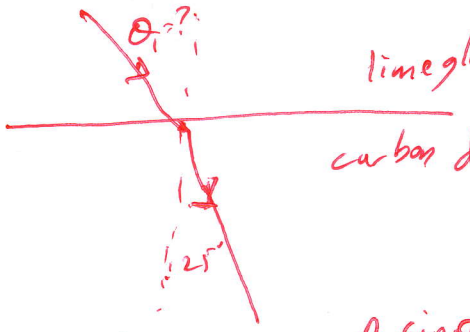
$n_1 = \dfrac{1.52 \sin 24.4°}{\sin 26.0°}$

$n_1 \approx 1.43$

Antifreeze

SLW2B
Pg 1-2

3)



limeglass $n = 1.46$

carbon disulfide $n = 1.63$

$n_1 = 1.46$

$\theta_1 = ?$

$n_2 = 1.63$

$\theta_2 = 25°$

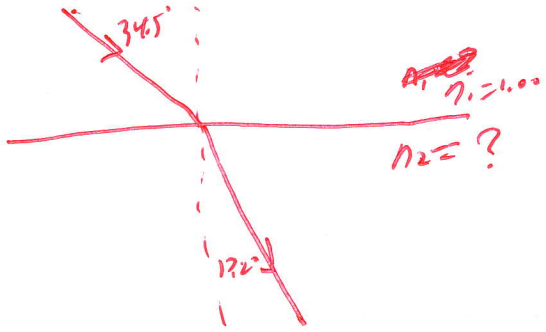
$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_1 = \frac{n_2 \sin\theta_2}{n_1}$

$\sin\theta_1 = \frac{1.63 \sin 25°}{1.46}$

$\theta_1 = 28.2°$

4)



$n_1 = 1.00$

$\theta_1 = 34.5°$

$n_2 = ?$

$\theta_2 = 17.2°$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\frac{n_1 \sin\theta_1}{\sin\theta_2} = n_2$

$\frac{1.00(\sin 34.5°)}{\sin 17.2°} = n_2$

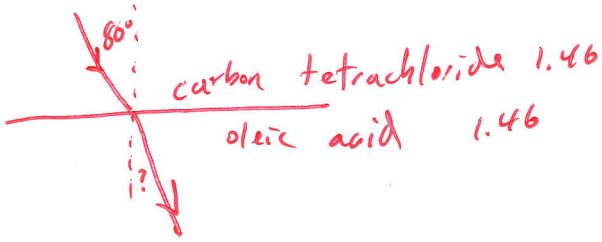
$1.92 \approx n_2$

$\therefore$ Not Diamond!

SLWS 2B

#s 3-4

5)



$n_1 = 1.46$
$\theta_1 = 86°$
$n_2 = 1.46$
$\theta_2 = ?$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

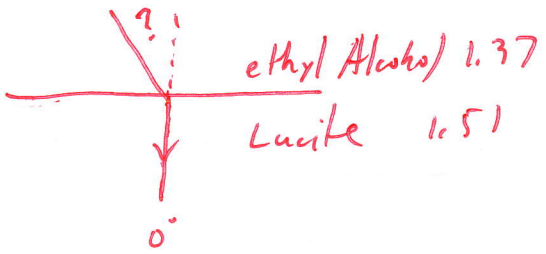
$\frac{n_1 \sin\theta_1}{n_2} = \sin\theta_2$

$\frac{1.46 \sin 86°}{1.46} = \sin\theta_2$

$\sin 86° = \sin\theta_2$

$\therefore \theta_2 = 86°$

6)



$n_1 = 1.37$
$\theta_1 = ?$
$n_2 = 1.51$
$\theta_2 = 0°$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_1 = \frac{n_2 \sin\theta_2}{n_1}$

$\sin\theta_1 = \frac{1.51 \sin 0°}{1.37}$

$\sin\theta_1 = 0°$

$\theta_1 = 0°$

SLWS2B
#s 5–6

1. An incident beam in ice at 45.7° to the normal enters glycerin. What is the angle of refraction?

2. An unknown substance has an incident ray of light with an angle of 26.0°. If the angle of refraction is 24.4° in crown glass, what is the unknown substance?

3. If a ray travelling through lime glass produces an angle of refraction of ~~85°~~ 25° in carbon disulfide, what is the angle of incidence?

4. A jeweler is testing a material to see if it is diamond. As the material is put in front of an incident ray with an angle of 34.5°, and the angle of refraction is 17.2°, what is the jeweler's conclusion?

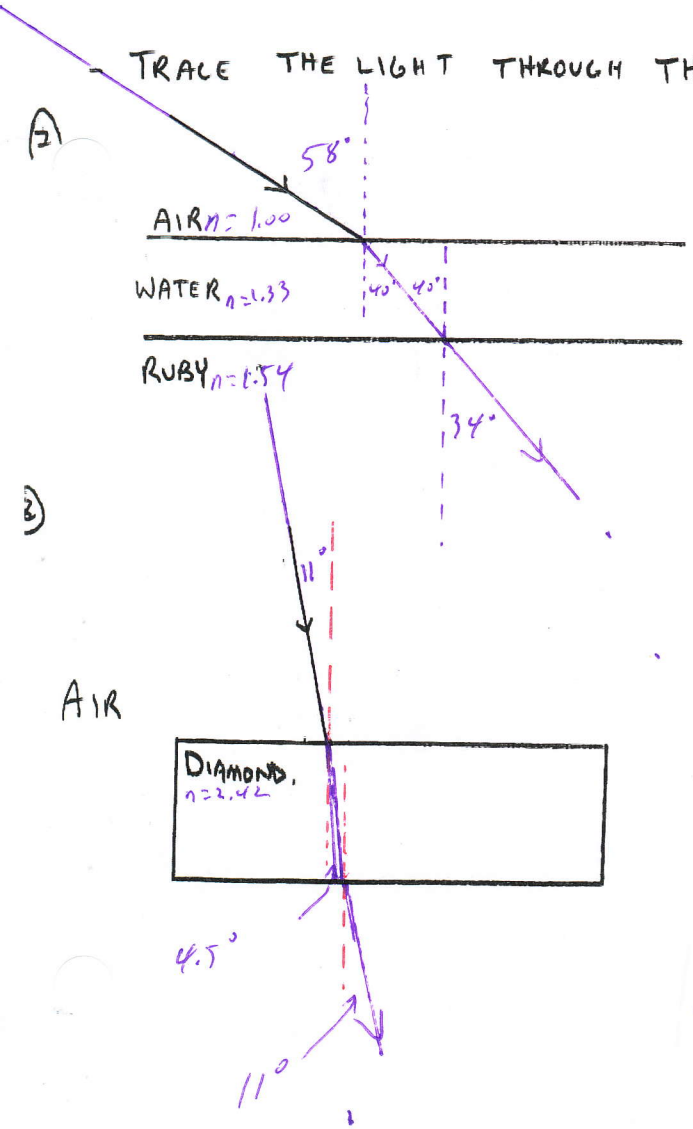
5. A beam of light from carbon tetrachloride enters oleic acid. If the angle of incidence is 86°, what is the angle of refraction?

6. A beam of light enters Lucite from ethyl alcohol. If the angle of refraction is 0°, what is the angle of incidence?

TRACE THE LIGHT THROUGH THE SUBSTANCES

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

(2)



Air → Water

$\sin\theta_2 = \frac{1(\sin 58°)}{1.33}$

$\theta_2 = 40°$

Water → Ruby

$\sin\theta_2 = \frac{1.33(\sin 40)}{1.54}$

$\theta_2 = 34°$

(3)

Air → Diamond

$\sin\theta_2 = \frac{1(\sin 11)}{2.42}$

$\theta_2 = 4.5°$

Diamond → Air

$\sin\theta_2 = \frac{2.42(\sin 4.5°)}{1}$

$\theta_2 = 11°$